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The
REFUSE DISPOSAL
PROBLEM
IN SMALL
COMMUNITIES

*VILLAGES
PUBLIC INSTITUTIONS
INDUSTRIAL PLANTS
ENCAMPMENTS*

By ROBERT BALMER
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150 Nassau Street, New York

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THE REFUSE DISPOSAL PROBLEM

In

Villages

Military Encampments

Small Communities

Hospitals

Industrial Plants

Penitentiaries

The following illustrations are given to show the possibilities of the sanitary and economical disposal of garbage and other refuse in small communities.

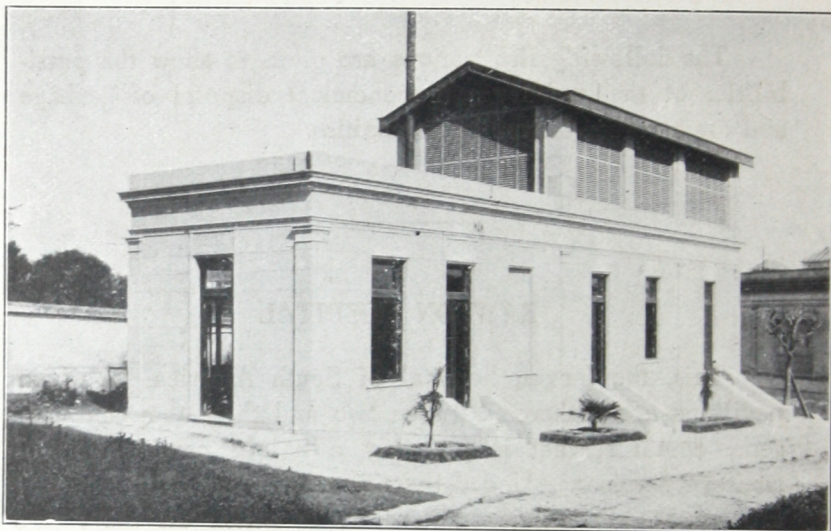
RAWSON HOSPITAL

This, the largest hospital of South America, in whose pavilions are gathered between two and three thousand persons, contains what is probably a unique combination of sanitary services. Under the same roof (see illustrations) are gathered a Balmer destructor, in which all the refuse produced by the Hospital is destroyed, and a sterilizing plant for the treatment of infected bedding and clothing. The hot gases of combustion pass through a vertical boiler (shown in the second illustration). The steam thereby developed is piped through a partition wall to a steam autoclave in the adjoining room. In the autoclave all the bedding and clothing of the hospital is regularly sterilized and conditioned for laundering.

The two services of destroying the garbage and rubbish and sterilizing the bedding and clothing are carried out by one official.

The chalet covering both services is neat. The operations are completely inodorous and inoffensive.

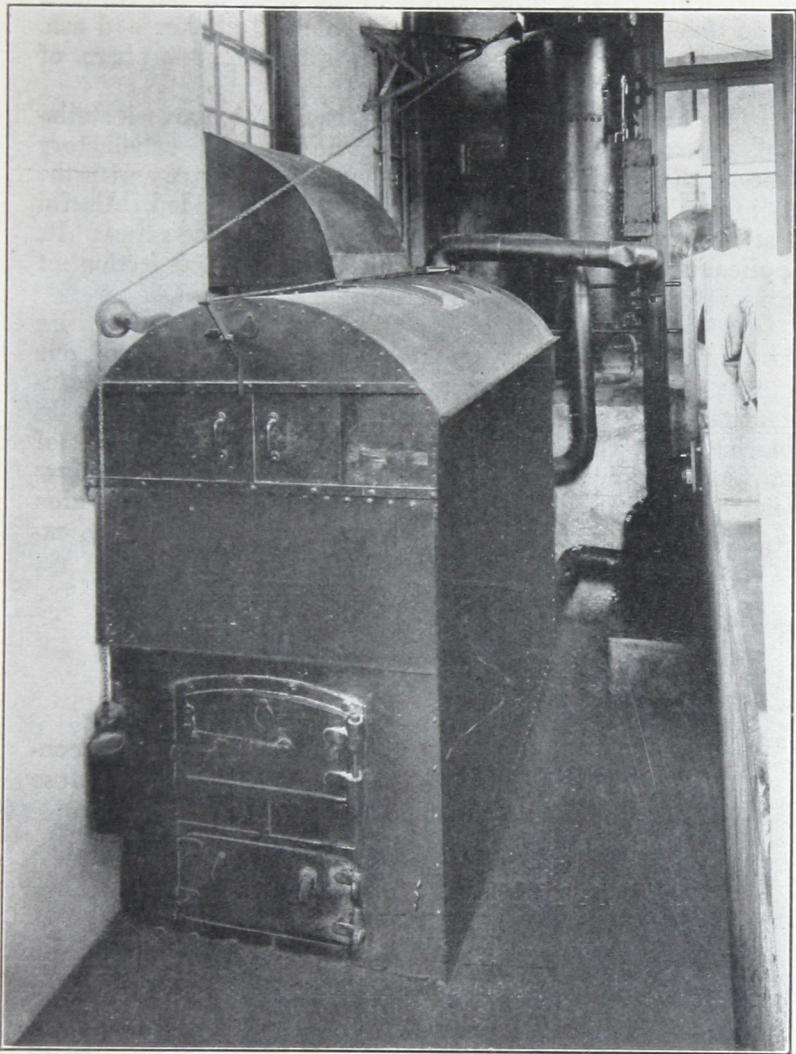
This installation shows one useful application of the small refuse destructor, if properly designed, which may be duplicated in similar large institutions. The refuse from hospitals is often of a specially dangerous character. It should not be carried through the streets, but should be destroyed on the spot, under the sanitary supervision which usually prevails in such institutions.



Chalet containing refuse destructor and disinfecting plant in Rawson Hospital, Buenos Aires

The type of destructor employed in the Rawson Hospital deserves a brief reference. In addition to being designed in accordance with the Balmer System (in which new thermodynamic principles are put into successful operation), it is built on the iron-clad pattern, with air-jacketted, non-conducting walls. Air is circulated through these walls, and drawn over the refuse in the storage bin and from there through the fan-blower and then is driven through the fire-grate, where

the gases absorbed by the air from the warming and fermenting refuse are destroyed in intense combustion. The outside



Interior view, showing Balmer destructor, connected with steam boiler, in Rawson Hospital

walls of the destructor remain cool, so that, even when in full operation, the temperature in the room is comfortable.

The refuse is discharged into the storage bin of the furnace from outside of the building through a chute which is clearly seen in the second illustration. From the storage bin, the refuse passes direct to the furnace, the discharge being controlled by a lever shown to the right of the furnace. At no time, until it is drawn out as calcined clinker and ash, does the refuse come into contact with the atmosphere of the room.

The specially dangerous refuse is, in the above installation, destroyed by the only truly scientific and satisfactory process, that of fire. Its cartage through the streets, with the additional danger and expense involved, is avoided. Useful heat is developed by the auto-combustibility of the refuse. Its application, in the Rawson Hospital, to the disinfection of bedding and clothing, will recommend itself to the management of many similar institutions. Others may prefer to utilize the heat as an auxiliary to the steam-heating service of one or more pavilions, as was done in the case of the Mercedes Hospital-Asylum, another large institution of Buenos Aires. In this latter case, the ashes from the steam and power plant of the hospital were first used as fuel in the destructor, before being finally carted away as waste. In this way, the function of the destructor as a heat producer and distributor was extended over a larger portion of the day.

NOTE:—The above plant, and the following, if operated continuously, would take care of the garbage and refuse of a population of 5,000 and 6,000 respectively.

“Amongst the tasks of readjustment and reconstruction which today face our communal life, it would be difficult to find one more important or more urgent than the endowment of our cities with a truly modern refuse elimination service, developed in due co-ordination with the other essential elements of every well-organized municipality.”

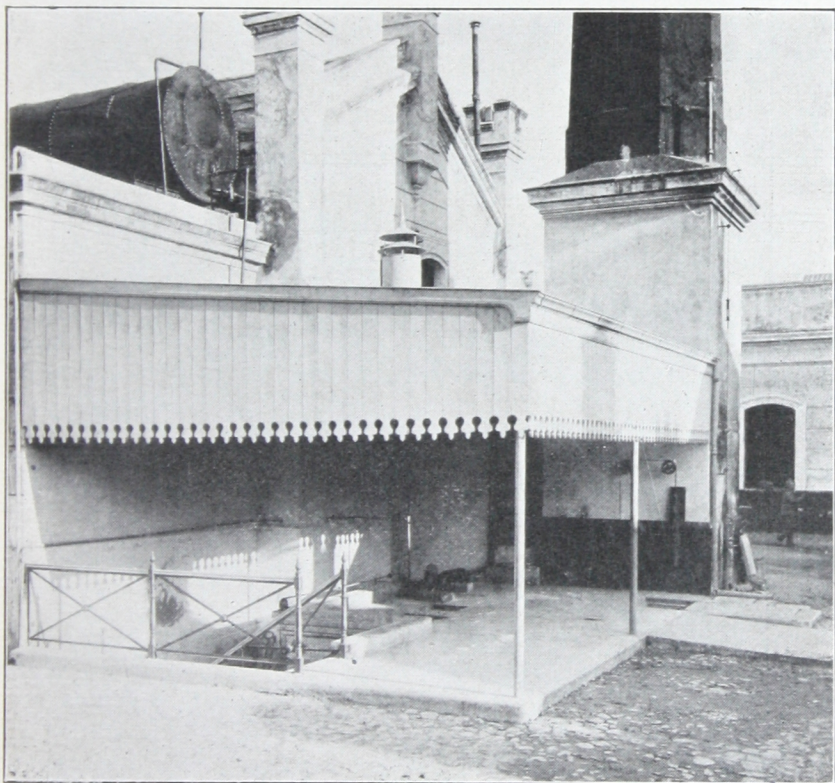
(“Sanitary Refuse Service for Modern Cities”)

NATIONAL PENITENTIARY

The services rendered by the Balmer destructor in this vast institution put it into a class by itself.

As will be seen by illustrations Nos. 1 and 2, the destructor is a brick structure, built below ground and is covered by a neat, open chalet. The refuse is tipped from small collecting trucks. The feed doors are opened and closed before and after every load, and the upper surface swept clean.

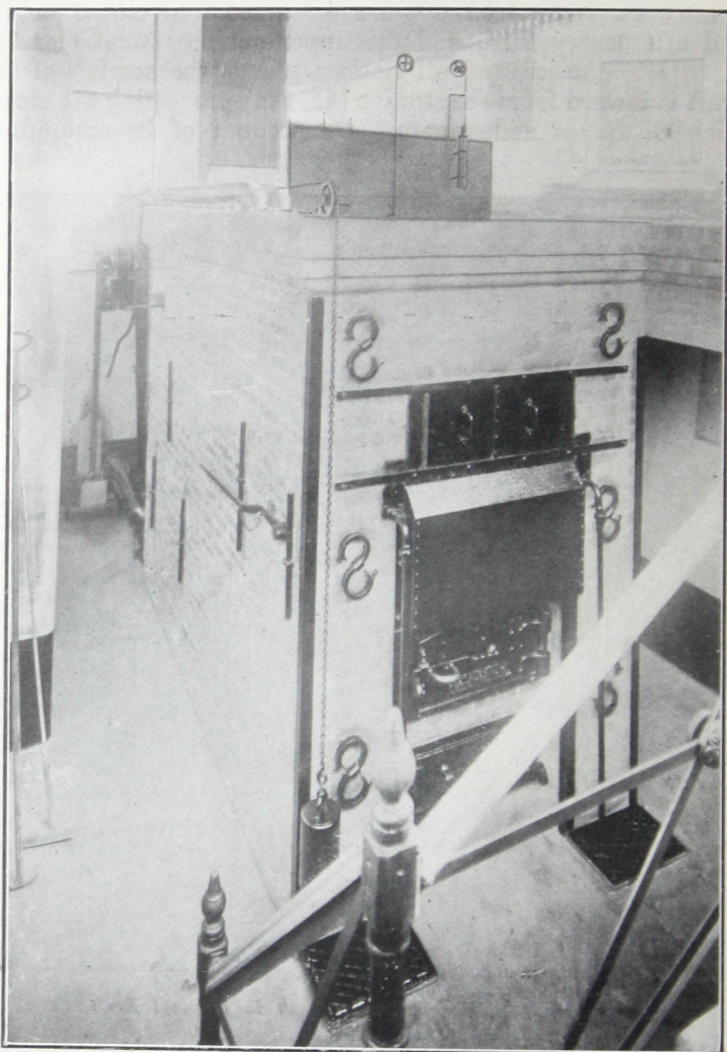
As in the case of all Balmer plants, the suction of the draft is inward from the storage bin, thus preventing the emanation of fumes and vapors. On account of its scrupulous



General view of Balmer destructor plant in National Penitentiary

cleanliness and the sweetness of the atmosphere in and about it, this plant has been mistaken for a small modern bakery. Although open to easy inspection, its real function is rarely guessed by the visitor.

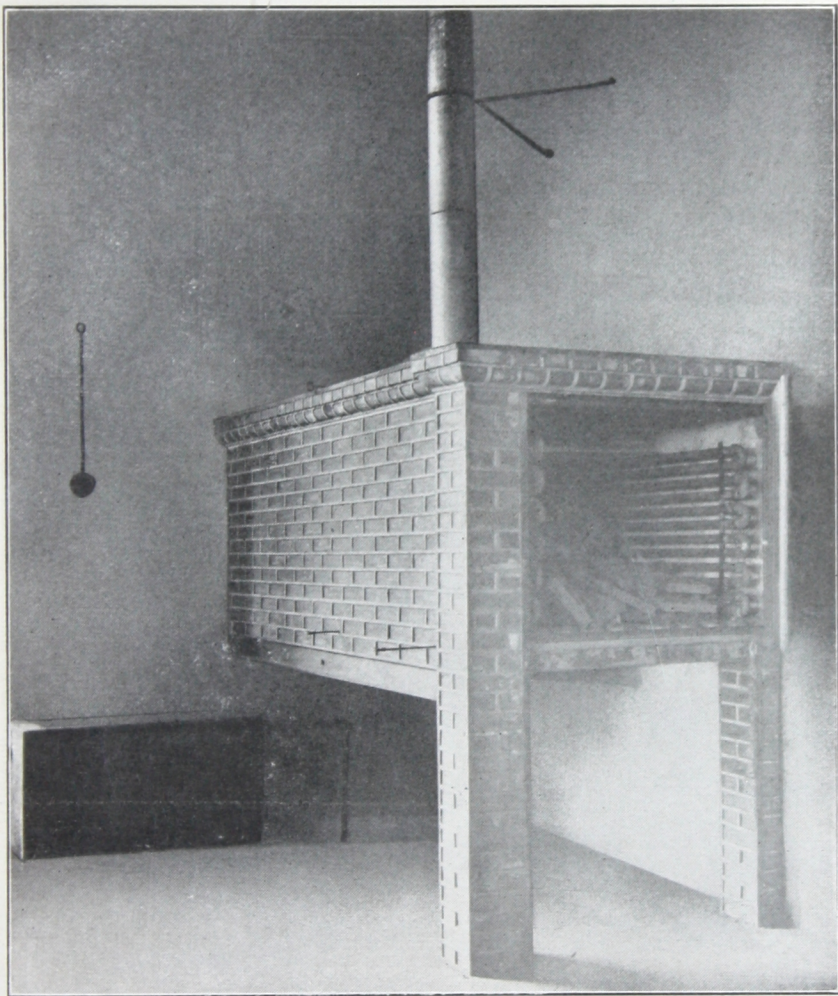
For economic reasons, the destructor was located so as to connect directly with the chimney of the existing power plant. The cylindrical Feed Water Tank of this plant may be seen in view No. 1. From this tank, a pipe connection runs to an Economizer which stands between the destructor combustion chamber and the Chimney. The water from the tank, on passing



Interior view, showing brick-built Balmer destructor, at National Penitentiary

through the Economizer, is raised to a high temperature. It is then led through an underground conduit to a building shown in the background of view No. 1. This building con-

tains a large work-shop where desks and other furniture are made for the national schools. View No. 3 shows a corner of this building, containing a couple of large glue melting pots and a drying-kiln. Both of these are heated by the afore-said hot-water pipe. After performing these services, the pipe doubles back through the conduit and enters the hot-water well of two steam boilers in the Power House.



View showing glass melting pot and drying kiln heated by Balmer destructor at National Penitentiary

The ash and clinker taken from the destructor furnace are first carefully leached. The caustic potash and carbonate of potash liquor thus obtained is then used, with fat and grease

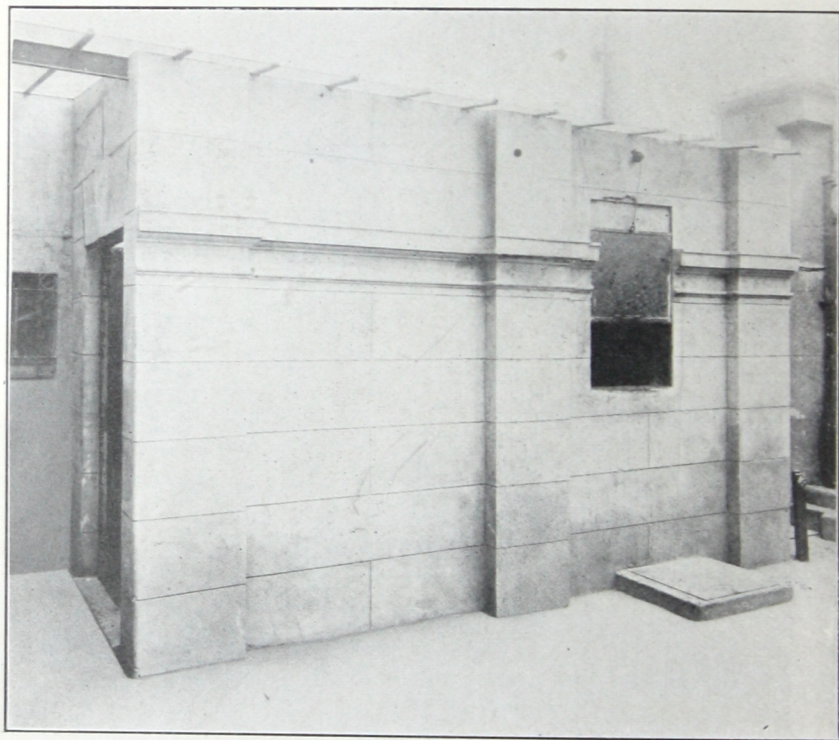
reserved from the kitchen, to make a liquid soap, which soon displaced the ordinary soap used in the large laundry of the institution.

For over two years the ash and clinker (freed of their soluble alkalis) were used in making roads and pathways in the extensive grounds of the penitentiary. Afterwards, these materials, mixed with cement and coloring matter, were made into blue and gray tiles for the pathways.

The actual operation of the destructor proper was put in sole charge of a "trusty" convict, who received a wage of $3\frac{1}{2}$ c. for the 8-9 hours during which the plant is in service.

SPANISH HOSPITAL

Until the Balmer destructor was erected in this institution, the refuse (including garbage, hospital bandages and mis-



Exterior view of Balmer destructor in Spanish Hospital

cellaneous rubbish and ash) was all delivered to the big City dump, where along with other wastes, it was exploited commercially and industrially in various ways.

This odious condition of affairs came to an end with the erection of the small Balmer destructor. The hospital refuse is now collected and destroyed as produced.



Interior views of Balmer Destructor in Spanish Hospital

In this particular instance, the space available was very limited, and so no attempt was made to utilize the heat of combustion. The number of persons served by the plant is about 1,200.

THE VILLAGE REFUSE DESTRUCTOR

The village is almost universally behind the hospital, the penitentiary and other social institutions in the settlement of the garbage and refuse problem. The numerically larger community seems to be slower to organized action than the smaller. The reasons are sociological and do not concern us here.

And yet the problem, from the technical viewpoint, is easier of solution in the village than in the isolated institution. In the village, the quantities of material to be dealt with are larger. Consequently, the firegrate area is larger and can be divided into counterbalancing or compensating units, which correct the deficiencies of their neighbors and help to maintain constant and higher temperatures. The village, too, has a wider range of application for the ash and clinker produced by the destructor. With the increased amount of refuse, the labor cost for its destruction falls in inverse ratio. Moreover, the budget cost for collection and cartage, which is absent in the case of the hospitals, for instance, offers an opportunity for substantial economies by the operation of a sanitary, odorless destructor erected in a central, easily accessible site. This operates at once in the financial relief, convenience and general satisfaction of the taxpayer.

In addition to this, it should be considered that the refuse dump is always an obstacle to the property development of at least one section of the village. The modern destructor removes that obstacle. It does more. Under proper management, it can effectively promote development by providing excellent road-making and building material from its vitrified clinker.

PLANNING THE REFUSE SERVICE

The organization of the new sanitary service of refuse disposal is affected by so many different local factors that it should be undertaken only after a careful expert study of these factors, in collaboration with the municipal authorities and the best local opinion. In some cases, local opinion may require educating as to the high standards attained by modern refuse sanitation. In all cases, the public interest must be well served, a serious obstacle to the community's development removed and advantage taken of the new service to increase the attractiveness of the village to the residents themselves and to the prospective newcomers.

A good school is no better asset to a community than a clean, economical, productive refuse service ought to be.

The day of the hog farm and the refuse dump as the solution of the refuse disposal service is long past for every self-respecting, progressive community.

GARBAGE-FED HOGS: "Two objects which find their way into the garbage can in considerable quantities are phonographic needles and the very thin glass from the electric light bulbs. . . . If the householders could imagine the tortures suffered by the unfortunate animals when their intestines are perforated and torn by the sharp points of glass and needles, they would join the humane society and help the city in eliminating this nuisance."

(Report of Dr. E. C. W. Schubel, Superintendent of the Garbage Department and Hog Farm, of Lansing, Mich. 1919)

"A High Standard of Hygiene, in any community, is accompanied by an economic reward greater than that attending the more or less illicit evasions of the laws of sanitation which a short-sighted greed of gain has induced not a few municipalities to sanction. Loyalty to the prescriptions of civic hygiene pays in the long run."

(*"Sanitary Refuse Service for Modern Cities"*)

"The Balmer System is not a mere question of furnaces and other mechanical devices. It is much more than that. It is a complete coordinated public service, the result of long practical experience, functioning in perfect harmony and reciprocity with the other essential services of a properly constituted social organism."

("The Balmer System: How it works")

